SD-95396-01
VOICE CONTROLLED GAIN AMPLIFIER
USING AMPLIFIER TEST SET CIRCUIT
COMMON SYSTEMS

1. GENERAL

1.01 This section describes a method of testing the voice-controlled gain amplifier SD-95398-01, using test circuit SD-95452-01 (J99235W) and an external transmission measuring set. It replaces Issue 1, (Provisional) dated August 1953.

1.02 The tests and the features tested are:

A. Nonoperate Pad Currents

This test checks nonoperate currents of the receiving, delayed operate, and transmitting pads.

B. Transmitting Gain

This test checks gain of transmitting amplifier circuit and balance between A and B transmitting inputs.

C. Receiving Gain

This test checks gain of receiving amplifier circuit and operation of output limiter.

D. Sidetone Loss

This test checks speech and room noise sidetone losses.

E. Sensitivity

This test checks "just operate" and "just release" sensitivity of amplifier, and attack and release characteristics of control circuit.

F. Operate Pad Currents

This test checks operate currents of the receiving, delayed operate, and transmitting pads.

G. Listening Test

This test checks control circuit and pad operation by using tone to simulate a conversation.

1.03 A visual check shall be made prior to testing an amplifier to insure that no metal-envelope-type vacuum tubes are installed in the amplifier circuit. If any replacement of tubes V4 and V5 is required, selection by trial may be necessary to meet the requirements specified in test A.

1.04 If the position associated with the amplifier to be tested is in service, substitution by the emergency amplifier shall be effected as described under Preparation step 2b.

1.05 Lettered Steps: The letters a, b, c, etc, are added to a step number to indicate that the step covers an action which may or may not be required, depending on local conditions. The conditions under which a lettered step or series of steps should be made are given in the action column, and all steps governed by the same condition are designated by the same letter. Where a condition does not apply, the associated steps should be omitted.

2. APPARATUS

All Tests

2.01 Amplifier test set circuit J99235W (SD-95452-01).

2.02 Nos. 13A or 13B transmission measuring set, (TMS), or No. 2B noise measuring set.

2.03 Patching cord - two P2A cords, 6 feet long, equipped with two No. 347B plugs (2P3B cord) (for energizing amplifier filaments).

2.04 Patching cord - P3E cord, 6 feet long, equipped with two No. 310 plugs (3P7A cord) (for patching test circuit to tone supply).

2.05 Patching cord - eight P2AA cords, 6 feet long, equipped with two No. 241A plugs (2P13B cord) (for patching amplifier to be tested to test circuit, and to emergency amplifier, if required).

2.06 Patching cord - three P2Y cords, 8 feet long, equipped with two No. 347A plugs (2P19A cord) (for patching amplifier to test circuit).

2.07 Patching cord - S3B cord, 10 feet long, equipped with one No. 310 plug and three No. 131 cord tips (3W1A cord) (for patching transmission measuring set to SEND 1MW jack or to test circuit).

Test G

2.08 No. 52B operator telephone set.

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3. PREPARATION

STEP	ACTION	VERIFICATION
1	Restore all keys to normal and set attenuator dial at 0	
2a	If position associated with amplifier to be tested is not in service - Patch FC AMP jack of test circuit to AMP FC jack of amplifier, using P2A cord	
3b	If position associated with amplifier to be tested is in service - Connect emergency amplifier to position by patching as follows:	
	LINE jack of emer ampl to TEL L jack of ampl to be tested, using P2AA cord A IN jack of emer ampl to TRS A jack of ampl to be tested, using P2AA cord B IN jack of emer ampl to TRS B jack of ampl to be tested, using P2AA cord OUT jack of emer ampl to REC jack of ampl to be tested, using P2AA cord AMP FC jack of emer ampl to TEL FC jack of ampl to be tested, using P2A cord FC AMP jack of test circuit to AMP FC jack of ampl to be tested, using P2A cord	
4c	If Nos. 13A or 13B transmission measuring set is used - Connect set to power supply, operate power key, and allow ten minute warmup period	
5d	If No. 2B noise measuring set is used - Connect set to power supply, operate power key, and allow ten minute warmup period	
6d	Calibrate No. 2B set	
	Note: Check calibration of No. 2B set at intervals during test.	
7	Connect cord tips of S3B cord to TMS	
8	Insert plug of S3B cord into SEND IMW jack in amplifier jack field	Meter reads 0 db
9	Remove plug from SEND IMW jack and insert into TMS jack of test circuit	
10	Connect test circuit to amplifier to be tested by patching as follows:	
	TONE jack of test circuit to SEND IMW jack of amplifier jack field, using P3E cord A IN jack of test circuit to A IN jack of amplifier jack field, using P2AA cord B IN jack of test circuit to B IN jack of amplifier jack field, using P2AA cord LINE jack of test circuit to LINE jack of amplifier jack field, using P2AA cord OUT jack of test circuit to OUT jack of amplifier jack field, using P2AA cord TRSG PAD jack of test circuit to TRSG PAD jack of amplifier panel, using P2Y cord REC PAD jack of test circuit to REC PAD jack of amplifier panel, using P2Y cord DEL OPR PAD jack of test circuit to DEL OPR PAD jack of amplifier panel, using P2Y cord	
	Caution: Make no tests before all of above patching is completed, as damage to the test circuit meter may otherwise result.	

4. METHOD

STEP	ACTION	VERIFICATION
	A. Nonoperate Pad Currents	
11	Operate CDN key to PAD position	
12	Operate MTR key to REC position	Test oirouit meter reads 0
	Caution: If meter shows a positive deflection, trouble is indicated. Clear trouble before proceeding to avoid meter damage.	
13	Depress SENS key to obtain reading, then release	Meter reads minimum 10 μa (See step 18e)
14	Operate MTR key to DO position	Meter reads 0
	Caution: See step 12 above.	
15	Depress SENS key to obtain reading, then release	Meter reads minimum 10 μa (See step 18e)
16	Operate MTR key to TRSG position	Meter reads 0
	Caution: See step 12 above.	
17	Depress SENS key to obtain reading, then release	Meter reads minimum 10 μa (See step 18e)
18e	If requirements of steps 13, 15, and 17 are not met - Check tubes V4 and V5 by replacing, to obtain minimum readings of 15 μa	
	Note: It may be necessary to select tubes for these applioations to meet these requirements. However, tubes whioh do not satisfy here may be used as V1, V2, V3, or V6.	
19	Restore all keys	
	B. Transmitting Gain	
11	Operate TRANS key to T position	
12	Set attenuator dial at 0 db	TMS meter reads 0 ±2 db
13	Operate IN key to B position	Meter reads 0 ±2 db
14e	If requirements of steps 12 and 13 are not met - Adjust RT potentiometer on amplifier panel to obtain reading of 0 ±0.5 db	
	Note: The difference in the readings of steps 12 and 13 shall be less than 1.0 db.	
15	Restore all keys	
	Note: Test B readings are for a net transmitting amplifier gain of 0 db.	
	C. Receiving Gain	
11	Operate TRANS key to R position	
12	Set attenuator dial at 30 db	TMS meter reads −23.4 ±2 db

STEP	ACTION	VERIFICATION
13e	If requirement of step 12 is not met - Adjust PR potentiometer on amplifier panel to obtain reading of −23.4 ±0.1 db	
14	Set attenuator dial at 15 db	Meter reads −10 ±2.5 db
15	Set attenuator dial at 0 db	Meter reads −6 ±2 db
16	Restore all keys Note: Test C readings are for a net receiving amplifier gain of 10 db.	
	D. Sidetone Loss	
11	With attenuator dial set at 0 db, read speech sidetone loss on TMS meter Note: Step 12 for checking room noise sidetone loss is not required on a routine basis. If the test is made, the PD potentiometer must afterwards be returned to its former setting.	TMS meter reads −24 ±4 db
12	Rotate PD potentiometer on amplifier panel to its extreme counterclockwise position	Meter reads −14 ±4 db
	E. Sensitivity	
11	Operate IN key to −20 position	
12	Set attenuator dial at 30 db	
13	Operate MTR key to REC position	Test circuit meter reads substantially zero
14	Slowly decrease attenuator loss, in 1 db steps, until, at some particular setting, the test circuit meter jumps to a positive reading	Meter reads 3 to 8 ma
15	Return attenuator dial to 30 db and repeat step 14 to confirm setting at which meter just jumps off zero	Meter reads 3 to 8 ma Note: Attenuator setting plus −20 db is recorded as "just operate" sensitivity of amplifier. This figure shall be −29 ±1 db
16e	If requirement of step 15 is not met - Adjust PD potentiometer on amplifier panel for "just operate" calculation of −29 ±0 db	
17	Decrease attenuator setting from the "just operate" value of step 15 or 16e, in 1 db steps, for five scale divisions of attenuator dial	Meter reading increases no more than 1 ma over that obtained in steps 14 and 15
18	Set attenuator dial at 0 db	Meter reads some positive value
19	Slowly increase attenuator loss, in 1 db steps, until at some particular setting, the meter reading drops abruptly.	Meter reads 0 ma

STEP	ACTION	VERIFICATION
20	Return attenuator dial to 0 db, and repeat step 19 to confirm setting at which meter drops to zero	Meter reads 0 ma Note: Attenuator setting plus −20 db is recorded as "just release" sensitivity of amplifier. This figure shall be 3 to 10 db greater than the "just operate" value of step 15 or 16e
21	Restore all keys	

F. Operate Pad Currents

11	Operate IN key to −20 position	
12	Set attenuator dial to "just operate" setting, determined in step 15, test E	Test circuit meter reads minimum 2.5 ma
13	Operate MTR key to REC position	Meter reads minimum 4 ma
14	Operate MTR key to TRSG position	Meter reads minimum 4 ma
15	Restore all keys	

G. Listening Test

11	Plug operator telephone set into TEL SET jack of test set circuit and don set	
12	With attenuator dial set slightly below "just operate" setting obtained in test E, operate CDN key to TEL position	
13	Operate TRANS key to R position	Tone is heard in receiver
14	Speak into transmitter	Tone level is decreased, and pad operation with speech input is indicated by test circuit meter fluctuations
15	Rotate attenuator dial to zero	Tone level does not become unduly high